



(19)

(11) Publication number: **10313128 A**

Generated Document.

**PATENT ABSTRACTS OF JAPAN**

(21) Application number: 09139440

(51) Intl. Cl.: H01L 31/04 C30B 33/12 H01L 21/306

(22) Application date: 13.05.97

<p>(30) Priority:</p> <p>(43) Date of application publication: 24.11.98</p> <p>(84) Designated contracting states:</p>	<p>(71) Applicant: MATSUSHITA ELECTRIC IND CO LTD</p> <p>(72) Inventor: KIM HANMIN SHIBUYA MUNEHIRO YOSHIDA TETSUHISA KITAGAWA MASATOSHI</p> <p>(74) Representative:</p>
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**(54) ANISOTROPICALLY ETCHING METHOD FOR SILICON SUBSTRATE AND MANUFACTURE OF SOLAR CELL**

(57) Abstract:

**PROBLEM TO BE SOLVED:** To deeply form anisotropically etched pits into an Si substrate surface by introducing an etching gas conc. at least either  $\text{ClF}_3$  or  $\text{XeF}_2$  into a reactor chamber at the atmospheric pressure, and etching the substrate surface at specified temp. with this gas to form anisotropically etched pits thereinto.

**SOLUTION:** A  $\text{ClF}_3$  gas is fed into a reaction chamber 13 at room temp. and atmospheric pressure, at a rate of 0.2 lit./min. with  $\text{N}_2$  fed at 2 lit./min. to etch Si 100 and 111 substrate for 2 min. at room temp., thereby forming rectangular and pyramid-like etched pits into the (100)- and (111)-plane substrates. The temp. rise in the structure due to the heat may change the isotropic etching, and hence substrate temp. is suppressed below  $130^\circ\text{C}$ . After cooling the substrate, the above steps are repeated to make the anisotropic etching, thus forming a deep irregularities structure. Thus, a substrate having square and pyramid etched pits is formed.

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